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ABSTRACT

This study examines the attitudes of students toward modern technology, their attitudes toward learning using modern technology in an academic setting, and whether there is a correlation between the two attitude variables. The investigation looked at the effects of gender and grade level on students' attitudes toward technology and toward learning using technology. Data for this study were obtained from a survey of grade 7 and 8 students (N=106) in an elementary school in Ontario, Canada which introduced modern technology into the regular school program beginning in September, 1991. The school's technological program includes the use of computers in an ongoing manner by all students in the school for classroom work, assignments, and recreational pursuits; and by teachers for teaching from a computer assisted learning perspective. Survey data were collected in the fall of 1992. The data were analyzed using descriptive statistics, correlational analyses, and a one-way analysis of variance. Results showed that students had a positive attitude toward modern technology and toward learning using modern technology. There was a high positive correlation between students' attitudes toward technology and toward learning. Neither gender nor grade level had any effect on students' attitudes toward technology or on their attitudes toward learning using technology in an academic setting. Recommendations for further research are provided. (Contains 10 references.) (Author/SWC)

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MODERN TECHNOLOGY: THE RELATIONSHIP BETWEEN STUDENT ATTITUDES TOWARD TECHNOLOGY AND THEIR ATTITUDES TOWARD LEARNING USING MODERN TECHNOLOGY IN AN EVERYDAY SETTING

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Abstract

This study examined the attitudes of students toward modern technology and their attitudes toward learning using modern technology in an academic setting. It also attempted to determine if there was a correlation between the two attitude variables. The investigation looked at the effects of gender or grade level on students' attitudes toward technology and toward learning using technology.

Data for this study were obtained from a survey of 106 Grade 7 and Grade 8 students in an elementary school which introduced modern technology into the regular school program in September, 1991. The data were analysed using descriptive statistics, correlational analyses, and a one-way analysis of variance.

The results showed that students had a strong positive attitude toward modern technology and toward learning using modern technology. Further, there was a high positive correlation between students' attitudes toward technology and toward learning. The findings showed that gender or grade level had no effect on either students' attitudes toward technology or their attitudes toward learning using technology in an academic setting.

INTRODUCTION

As microcomputers and other forms of information- processing technology become commonplace in schools, there is a need to focus on the training and retraining of today's teachers. Properly used, technology can be the central agent for meaningful educational reform to the benefit of all learners. Because the learner is the central focus of education, not only is there a need to look at the achievement of the individual as he/she makes use of the new technology, but also to study the attitudes of the learner toward the technology (and toward learning itself) as it is introduced into the school setting.

We investigate the relationship between student attitudes and the increased use of technology on an every day basis. The school setting is one in which technology is available to students on a daily basis either in the classroom or in a technology workroom open to all students during the school day on a scheduled or unscheduled basis. The study is cross sectional design. The following questions form the basis of this study:

1. Do students have a positive attitude toward the modern technology introduced to the school?
2. Do students have a positive attitude toward learning using modern technology?
3. Is there a correlation between students' attitudes toward modern technology and their attitudes toward learning using modern technology?
4. Do gender or grade level have any effect on students' attitudes toward modern technology or their attitudes toward learning using modern technology ?

For the purpose of this research, technology refers to the modern technology introduced

to the school. It includes micro-computers, robotics, CD Roms, computer software, laser disks, video equipment, and hands-on materials such as Lego, Techno, and Temsi. What makes the study school unique is the level of computer and technological resources made available to the faculty and students for all aspects of their academic endeavours. The use of technology was incorporated into all aspects of the curriculum and administration of schol activities. Students refer to pupils in Grades 7 and 8.

In studies where microcomputers have been introduced into the educational setting, increased self-esteem and self-confidence and increased co-operative collaboration between students have usually been observed. Since data for this study were gathered from one school which has introduced modern technology into its regular program, the generalization of findings is limited. Further, the study was limited to Grade 7 and Grade 8 students in the school. The results of the study may not necessarily be applicable to other grade levels

SELECTED REVIEW OF THE LITERATURE

The use of technology as a basis for student instruction is a relatively new concept. Very little research has been completed regarding attitudes of students toward their school life or the use of technology as an everyday tool. However, Ahearn (1991) claims the result of the use of technology has a positive effect on student attitudes toward learning and school, for students can work at their own pace, and do not have to keep up with or wait for other students..

Lawton and Gerschner (1982) examined previous studies and used them to describe children's attitudes toward computers and computerized instruction. Their research showed that children found computers to: (a) be extremely patient, (b) never tire, (c) never get frustrated or angry, (d) never forget to correct or praise, and (e) individualize learning. Smith (1982)

suggests that the use of computers can reduce many of the negative side-effects normally attributed to the present system of learning, such as student boredom, and intimidation of asking questions.

Krendl and Brothier (1991) outlined a longitudinal study (3 years) on student responses to computers. The study looked at students' perceptions about computers on three dependent variables - preference, perceived learning, and perceived difficulty. The study involved 339 students selected from fourth through tenth grades in a public school system in Tennessee; 53.4 percent were female and 46.6 percent were male. A self-administered questionnaire was given at the same time each year for three sequential years. The following results were noted:

1. As students became more familiar with the technology, assessments of their enjoyment steadily declined. Girls' assessments of enjoyment were significantly lower at each point in time than were boys'. Younger students tended to rate the computer as more enjoyable at each point in time than did older students.

2. Girls found computers more difficult than boys each year. Elementary students rated the computer as significantly less difficult each year than did middle school and high school students.

3. Each additional year of experience with the technology resulted in lower student assessments of their perceived learning from computers. Girls' assessments of perceived learning were significantly lower than boys' at each point in time. Again younger students reported higher levels of perceived learning at each point in time than either middle school or high school students.

The amount of research dealing with modern technology was limited and focused on computers alone, or achievement rather than attitudes toward technology, or on generalizations about students' feelings toward technology. This was understandable as the development of most of the technology used today has occurred in the very recent past.

RESEARCH DESIGN

The data for this study were gathered in the fall of 1992. The school in which this study was conducted is located in Southwestern Ontario and is part of a separate elementary school system in that city. A full scale technological program has been operating since September, 1991. This technological program includes the use of computers in an ogoing manner by all students in the school for classroom work, for assignments, and even for recreational pursuits. Teachers made increased use of computers for teaching from a computer assisted learning perspective. Technology also included interactive games, software, and such devices as overheads designed to facilitate teaching and learning. Before the introduction of the technological facilities, the school operated under a traditional program from Junior Kindergarten to Grade 8. Approximately 600 students were enrolled in the school. The study group consisted of 104 students from Grades 7 and 8. The grade 8 class was chosen as a convenience sample as the researchers could get permission to test that group. Permission to conduct the study was obtained from the Director of Education, the principal of the school, and the Ministry of Education of Ontario.

DATA COLLECTION

The instrument used in the study was a questionnaire which consisted of a total of 61

questions (See Appendix A). A four-point response scale was used. The instrument was administered to the students in their respective classrooms and they were allowed sufficient time to respond to all questions on the instrument.

Four independent variables were used in this study. One was the modern technology available for use to the students. The second consisted of students from Grades 7 and 8. Gender and grade level were also used to study the effect of each, if any, on the two output variables.

Two dependent variables were retained: one was the attitudes of students toward the technology, and the second was the attitudes of students toward their learning using technology in an everyday school setting.

STATISTICAL TREATMENT

To determine if there was a positive relationship of students toward modern technology and a positive relationship of students toward learning using modern technology, mean scores were calculated for each part of the survey as well as for the overall survey. Standard deviations were used to verify whether or not the scores overlap between positive and negative responses. A mean score less than 2.5 indicated support for the research questions since there was no allowance for a neutral opinion on the survey.

To determine if there was a correlation between the attitudes of students toward modern technology and their attitudes toward learning using modern technology, the Person product-moment correlation was used.

A one-way analysis of variance (ANOVA) was used to determine if gender (male - female) or grade level (grade 7 - grade 8) had any affect on the attitudes of students toward

modern technology or on the attitudes of students toward learning using modern technology. F-scores were used and if the probabilities were 0.05 or less, the results were considered significant.

ANALYSIS OF DATA

Data analysis was conducted using Statistical Package for Social Sciences (SPSS/PC+). For the purposes of this study, three types of analyses were used from SPSS - descriptive statistics to analyse survey results regarding questions 1 and 2 of the study; a correlational analysis to respond to question 3 of the study; and a one-way analysis of variance (ANOVA) to analyse the survey results based on question 4 of the study. The results are presented in relation to the four research questions as previously outlined.

Descriptive Statistics

The survey questions were designed such that a low score (1 or 2) in a response indicated a positive attitude while a high score (3 or 4) implied a negative attitude toward the item being measured (See Appendix A). By selecting a scale from 1 to 4 rather than a scale of 1 to 5, a neutral result (ie. no opinion positive or negative) was avoided. Any score less than 2.5 indicated a positive attitude toward the item being measured, while a score in excess of 2.5 implied a negative attitude toward the item.

The first question in the study considered the attitudes of students toward modern technology: Did students have a positive attitude towards modern technology in a regular school setting? The mean scores from Part A and Part B of the survey were calculated for each student in the group of 106 students, and an overall mean score was tabulated for the entire group. Part

A of the survey contained 25 items that dealt with this question. In this study, no attempt was made to differentiate the reasons for a positive or negative attitude based on the types of questions contained in Part A. Hence, it was sufficient to consider only the mean scores of each student for Part A, and then calculate the overall mean score of the 106 students for Part A.

Table 4.1

Descriptive Statistics for Attitudes Toward Technology and Toward Learning

	Mean	Std Dev	Min	Max	N Obs
Part A	1.70	0.46	1.1	4.0	106
Part B	1.74	0.49	1.0	4.0	106

Table 4.1 outlines the mean score, standard deviation (Std Dev), minimum score (Min), maximum score (Max), and the number of students in the survey (N Obs) for Part A of the survey.

The overall mean score of 1.70 for the population of 106 students indicated a relatively strong positive attitude by students toward modern technology. If one considers one standard deviation variance, the scores from 1.24 to 2.16 suggested that approximately 68 percent of the students were well within the boundary of 2.5 for a positive attitude toward technology. Hence, it was concluded that students have a positive attitude toward modern technology.

The second question of this study concerned students' attitudes toward learning using modern technology in an everyday school setting. Part B of the student survey contained 26

questions that dealt with students' attitudes toward learning using technology. Since the concern of this study was only with either a positive or negative attitude toward learning, mean scores of students were calculated and then an overall mean for the entire population (106 students) was determined for Part B of the survey. The results are summarized in Table 4.1 in the same form as for Part A of the survey. The overall mean of 1.74 implied a strong positive attitude of students toward learning using technology.

Correlational Analysis

The third question of this study attempted to determine if there was a correlation between students' attitudes toward modern technology and their attitudes toward learning using technology. To determine if a correlation existed, the Pearson correlation coefficient was used to compare Part A of the survey, which dealt with student attitude toward technology, with Part B of the survey which looked at student attitude toward learning using technology. The Pearson correlation coefficient was 0.8547, indicating a high degree of positive correlation between students' attitudes toward modern technology and students' attitudes toward learning using technology.

Analysis of Variance

The final question in this study investigated whether or not gender or grade level had any effect on the attitude of students toward technology and toward learning using technology.

1. Does gender have an effect on students' attitudes toward technology and toward learning?
2. Does grade have an effect on students' attitudes toward

technology and toward learning?

To determine if such relationships existed, a one-way analysis of variance (ANOVA) was used on each part of the survey. The results of the ANOVA for gender are listed in Table 4.2.

Table 4.2

ANOVA Results for the Effect of Gender on Students' Attitudes Toward Technology and Toward Learning

Source	DF	Sum of Sqs	F Ratio	F Prob
Part A				
Between Groups	1	0.0963	0.4572	0.5004
Within Groups	104	21.9033		
Part B				
Between Groups	1	0.0763	0.3171	0.5746
Within Groups	04	25.0173		

DF - degrees of freedom Sum of Sqs - sum of squares

The probabilities using F- scores for Parts A and B based on gender of 0.5004 (Part A) and 0.5746 (Part B) were not statistically significant. Thus, there was no statistical evidence to support a relationship between gender and attitudes toward technology and toward learning. Thus gender had no effect on attitudes of students toward technology and toward learning.

Table 4.3 gives the results of the ANOVA for the effect of grade (7 or 8) on students' attitudes toward technology and toward learning. The F- scores based on grade level of 0.1235 for Part A and 0.0693 for Part B indicated that grade level had no effect on students' attitudes

toward technology and toward learning at the 0.05 significance level. There was no effect by grade level on the attitude of students toward technology and toward learning.

Table 4.3

ANOVA Results for the Effect of Grade on Students' Attitudes Toward Technology and Toward Learning

Source		DF	Sum of Sqs	F Ratio	F Prob
Part A					
Between Groups		1	0.4985	2.4114	0.1235
Within Groups		104	21.5011		
Part B					
Between Groups		1	0.7871	3.3678	0.0693
Within Groups		104	24.3065		

DISCUSSION AND CONCLUSIONS

This study looked at the relationship of modern technology to the attitudes of students toward modern technology and to the attitudes of students toward learning using modern technology in an everyday setting.

In this study, four questions were considered:

1. Do students have a positive attitude toward modern technology ?
2. Do students have a positive attitude toward learning using modern technology in an everyday setting ?
3. Is there a correlation between students' attitudes toward technology and their

attitudes toward learning using modern technology ?

4. Do gender or grade level have an effect on students' attitudes toward technology and toward learning using technology?

Previous studies which found that students had a positive attitude toward modern technology were supported in this study. A highly positive attitude toward the use of computers was evident in the present study as it had been in earlier research. Technology allowed students to work at a faster pace thus allowing them to learn more in a given period of time. A correlation between students' attitudes toward technology and their attitudes toward learning was supported by the findings of this study. If students were comfortable using technology, one would assume that their learning would reflect that positive response.

However, this study found that gender or grade level had no effect on students' attitudes toward technology and their attitudes toward learning using these technologies. The lack of a gender effect in this study might have been because expectations of student performance by teachers had changed. Students in this study were exposed to technology at a relatively early age and teachers did not differentiate between the sexes regarding the ability to manipulate the technological devices. The movement to eliminate differentiation by gender has changed teachers' perceptions towards girls and their ability to succeed at science and mathematics. Recent studies have shown that girls perform as well as boys in these areas (Bulcock & Whitt, 1989; Hurley, 1995; Whitt, 1989). Some of the reasons for a differential in gender related achievement might have been influenced by teachers' perceptions and social factors.

Grade level was found in this study to have no effect on the two attitude variables. This might have been because the Grade levels chosen were consecutive (Grades 7 and 8) and

differences in attitude were not apparent. Again, teachers' expectations appear to have changed and these changed expectations may have eliminated any differences in attitudes between the two grade levels.

One factor that might have been significant for all areas of this study was the so called "novelty" effect. The everyday use of modern technology was new to both the teachers and students in this study. Thus, the newness of using modern technology was a novel source of interest, but at some point this novelty effect might no longer exist.

In summary, this study found that students' attitudes toward modern technology and toward learning using modern technology in an everyday setting was positive. There was a positive correlation between students' attitudes toward modern technology and their attitudes toward learning using technology. Finally, gender and grade level had no effect on students' attitudes either toward technology or toward learning using technology.

RECOMMENDATIONS FOR FURTHER RESEARCH

The specific findings of this study lead to the following recommendations for further studies :

1. A longitudinal study on attitudes of students toward technology and toward learning using technology would address the concerns of the "novelty" effect of the introduction of technology into a traditional school environment.
2. This study is limited to one school in a county system. The study could be repeated at other schools within the system as they introduce technological centres into their program.
3. A study of attitudes toward technology and toward learning using technology could be extended over several grade levels to see if this variable does have an

effect on attitudes as other studies seem to suggest.

4. In this school system, technological centres are being introduced in the only secondary school in the system. The study could be repeated to investigate the attitudes of these students as they progress in a similar environment.

5. When the students in the study enter secondary school, they will be placed with students from other elementary schools who have not been exposed to the same degree of technological background. A study on the effect of this blending of technologically-advantaged students with those who have limited technological skills would be worthwhile research.

6. A study could examine the effects of teachers on student attitudes toward technology and toward learning.

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